Name:

at1119paper: Complete the Square, b = odd (v509)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 61x = -910$$

Add $\left(\frac{-61}{2}\right)^2$, which equals $\frac{3721}{4}$, to both sides of the equation.

$$x^2 - 61x + \frac{3721}{4} = \frac{81}{4}$$

Factor the left side.

$$\left(x + \frac{-61}{2}\right)^2 = \frac{81}{4}$$

Undo the squaring.

$$x + \frac{-61}{2} = \frac{-9}{2} \quad \text{or} \quad x + \frac{-61}{2} = \frac{9}{2}$$
$$x = \frac{61-9}{2} \quad \text{or} \quad x = \frac{61+9}{2}$$
$$x = 26 \quad \text{or} \quad x = 35$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 27x = -50$$

$$x^2 - 27x + \frac{729}{4} = \frac{529}{4}$$
$$\left(x + \frac{-27}{2}\right)^2 = \frac{529}{4}$$

$$x + \frac{-27}{2} = \frac{-23}{2} \quad \text{or} \quad x + \frac{-27}{2} = \frac{23}{2}$$
$$x = \frac{27-23}{2} \quad \text{or} \quad x = \frac{27+23}{2}$$
$$x = 2 \quad \text{or} \quad x = 25$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 47x = 378$$

$$x^2 + 47x + \frac{2209}{4} = \frac{3721}{4}$$

$$\left(x + \frac{47}{2}\right)^2 = \frac{3721}{4}$$

$$x + \frac{47}{2} = \frac{-61}{2} \quad \text{or} \quad x + \frac{47}{2} = \frac{61}{2}$$

$$x = \frac{-47 - 61}{2} \quad \text{or} \quad x = \frac{-47 + 61}{2}$$

$$x = -54 \quad \text{or} \quad x = 7$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 55x = -414$$

$$x^2 - 55x + \frac{3025}{4} = \frac{1369}{4}$$

$$\left(x + \frac{-55}{2}\right)^2 = \frac{1369}{4}$$

$$x + \frac{-55}{2} = \frac{-37}{2} \quad \text{or} \quad x + \frac{-55}{2} = \frac{37}{2}$$

$$x = \frac{55 - 37}{2} \quad \text{or} \quad x = \frac{55 + 37}{2}$$

$$x = 9 \quad \text{or} \quad x = 46$$